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Listing of Claims:

1-77. (Canceled)

78. (Currently Amended) A method of making a heterogeneous building block array, the method comprising:

~~forming~~ applying a plurality of building blocks to spots on a solid support in a plurality of spots, the each spot[[s]] comprising a plurality of 2, 3, 4, 5, or 6 different building blocks;

independently coupling a plurality of the different building blocks to the solid support in the spots through covalent bond, electrostatic interaction, or mixture combinations thereof, wherein a first spot comprises a first combination of building blocks, and a second spot comprises a second combination of building blocks.

79. (Previously presented) The method of claim 78, wherein coupling comprises forming a covalent bond between:

alcohol, phenol, thiol, amine, carboxyl, or carbonyl group of the building block; and
alcohol, phenol, thiol, amine, carboxyl, or carbonyl group of the support.

80. (Previously presented) The method of claim 79, wherein coupling comprises forming an ester bond between the building block and the support.

81. (Currently Amended) The method of claim 79, wherein coupling comprises forming ~~an~~ a disulfide bond between the building block and the support.

82. (Previously presented) The method of claim 79, wherein coupling comprises forming an acetal or ketal bond between the building block and the support.

83. (Previously presented) The method of claim 79, wherein coupling comprises forming an imine bond between the building block and the support.

84. (Previously presented) The method of claim 79, wherein coupling comprises forming an amide bond between the building block and the support.

85-86. (Canceled)

87. (Previously presented) The method of claim 78, wherein coupling comprises forming an electrostatic interaction between:

amine or carboxyl group of the building block; and

amine or carboxyl group of the support.

88. (Previously presented) The method of claim 87, wherein coupling comprises forming an electrostatic interaction between protonated amine of the building block and carboxylate of the support.

89. (Previously presented) The method of claim 87, wherein coupling comprises forming an electrostatic interaction between carboxylate of the building block and protonated amine of the support.

90. (Currently Amended) A method of making a heterogeneous building block array, the method comprising:

~~forming~~ applying a plurality of spots on a solid support, ~~the spots~~ each spot comprising a ~~plurality of 2, 3, 4, 5, or 6 different~~ building blocks; and

independently coupling a plurality of the different building blocks to the solid support in the spots;

wherein each building block independently comprises ~~ing~~ negative charge, positive charge, hydrogen bond donor, hydrogen bond acceptor, hydrophobic moiety, or ~~[[a]] combinations thereof~~.

91. (Previously presented) The method of claim 90, wherein coupling comprises forming an electrostatic interaction between a negatively charged group of the building block and a positively charged group of the support.

92. (Previously presented) The method of claim 90, wherein coupling comprises forming an electrostatic interaction between a positively charged group of the building block and a negatively charged group of the support.

93. (Previously presented) The method of claim 90, wherein coupling comprises forming an electrostatic interaction between:

amine or carboxyl group of the building block; and
amine or carboxyl group of the support.

94. (Previously presented) The method of claim 93, wherein coupling comprises forming an electrostatic interaction between protonated amine of the building block and carboxylate of the support.

95. (Previously presented) The method of claim 93, wherein coupling comprises forming an electrostatic interaction between carboxylate of the building block and protonated amine of the support.

96. (Previously presented) The method of claim 90, wherein coupling comprises interaction between hydrogen bond donor of the building block and a hydrogen bond acceptor of the support.

97. (Previously presented) The method of claim 90, wherein coupling comprises interaction between hydrogen bond acceptor of the building block and a hydrogen bond donor of the support.

98. (Currently Amended) The method of claim 90, wherein the support comprises a functionalized lawn coupled to the support, wherein and the different building blocks are independently coupled to the lawn.

99. (Previously presented) A method of making a receptor surface, the method comprising:

forming a region on a solid support, the region comprising a plurality of building blocks;
coupling the plurality of building blocks to the solid support in the region through covalent bond, electrostatic interaction, or mixture thereof.

100. (Previously presented) A method of making a receptor surface, the method comprising:

forming a region on a solid support, the region comprising a plurality of building blocks;
coupling the plurality of building blocks to the solid support in the region;
each building block independently comprising negative charge, positive charge, hydrogen bond donor, hydrogen bond acceptor, hydrophobic moiety, or a combination thereof..

101. (Previously presented) A method of making an artificial receptor, the method comprising:

forming a region on a support, the region comprising a plurality of building blocks;
coupling the plurality of building blocks to the support in the region through covalent bond, electrostatic interaction, or mixture thereof.

102. (Previously presented) A method of making an artificial receptor, the method comprising:

forming a region on a support, the region comprising a plurality of building blocks;
coupling the plurality of building blocks to the support in the region;
each building block independently comprising negative charge, positive charge, hydrogen bond donor, hydrogen bond acceptor, hydrophobic moiety, or a combination thereof.

103. (Previously presented) A method of using an artificial receptor comprising:
contacting a first heterogeneous molecular array with a test ligand;

the array comprising:

a support; and

a plurality of spots of building blocks coupled to the support;

the spots of building blocks comprising a plurality of building blocks; and

the building blocks being coupled to the support through covalent bond, electrostatic interaction, or mixture thereof;

detecting binding of a test ligand to one or more spots; and

selecting one or more of the binding spots as the artificial receptor;

wherein the building blocks in the array define a first set of building blocks, and the plurality of building blocks in the one or more binding spots defines one or more selected binding combination of building blocks;

determining the combinations of building blocks in the one or more binding spots;

developing, based on the combinations determined, one or more developed combinations of building blocks distinct from those in the one or more selected combinations of building blocks;

contacting a second heterogeneous molecular array with the test ligand,

the second heterogeneous molecular array comprising a plurality of spots,

the spots comprising a developed combination of building blocks;

the building blocks being coupled to the support through covalent bond, electrostatic interaction, or mixture thereof;

detecting binding of a test ligand to one or more spots of the second heterogeneous molecular array; and

selecting one or more of the spots of the second heterogeneous molecular array as the artificial receptor;

wherein the building blocks in the second heterogeneous molecular array define a second set of building blocks.

104. (Previously presented) A method of using an artificial receptor comprising:
- contacting a first heterogeneous molecular array with a test ligand;
- the array comprising:
- a support; and
- a plurality of spots of building blocks coupled to the support;

the spots of building blocks comprising a plurality of building blocks;
the building blocks being coupled to the support; and
each building block independently comprising negative charge, positive charge, hydrogen bond donor, hydrogen bond acceptor, hydrophobic moiety, or a combination thereof;
detecting binding of a test ligand to one or more spots; and
selecting one or more of the binding spots as the artificial receptor;
wherein the building blocks in the array define a first set of building blocks, and the plurality of building blocks in the one or more binding spots defines one or more selected binding combination of building blocks;
determining the combinations of building blocks in the one or more binding spots;
developing, based on the combinations determined, one or more developed combinations of building blocks distinct from those in the one or more selected combinations of building blocks;
contacting a second heterogeneous molecular array with the test ligand,
the second heterogeneous molecular array comprising a plurality of spots,
the spots comprising a developed combination of building blocks,
each building block independently comprising negative charge, positive charge, hydrogen bond donor, hydrogen bond acceptor, hydrophobic moiety, or a combination thereof;
detecting binding of a test ligand to one or more spots of the second heterogeneous molecular array; and
selecting one or more of the spots of the second heterogeneous molecular array as the artificial receptor;
wherein the building blocks in the second heterogeneous molecular array define a second set of building blocks.

105. (Previously presented) A composition comprising:
a support; and
a portion of the support comprising a plurality of building blocks;

the building blocks being coupled to the support through covalent bond, electrostatic interaction, or mixture thereof.

106. (Previously presented) The composition of claim 105, comprising building blocks coupled to the support through covalent bond.

107. (Previously presented) The composition of claim 106, comprising building blocks coupled to the support through ester bond.

108. (Previously presented) The composition of claim 106, comprising building blocks coupled to the support through disulfide bond.

109. (Previously presented) The composition of claim 106, comprising building blocks coupled to the support through acetal or ketal bond.

110. (Previously presented) The composition of claim 106, comprising building blocks coupled to the support through imine bond.

111. (Previously presented) The composition of claim 106, comprising building blocks coupled to the support through amide bond.

112. (Previously presented) The composition of claim 105, comprising building blocks coupled to the support through electrostatic interaction.

113. (Previously presented) The composition of claim 112, comprising building blocks coupled to the support through electrostatic interaction between protonated amine of the building block and carboxylate of the support.

114. (Previously presented) The composition of claim 112, comprising building blocks coupled to the support through electrostatic interaction between carboxylate of the building block and protonated amine of the support.

115. (Previously presented) The composition of claim 105, comprising building blocks coupled to the support through covalent bond and building blocks coupled to the support through electrostatic interaction.

116. (Previously presented) A composition comprising:
a support; and
a portion of the support comprising a plurality of building blocks;
the building blocks being coupled to the support;
each building block independently comprising negative charge, positive charge, hydrogen bond donor, hydrogen bond acceptor, hydrophobic moiety, or a combination thereof.

117. (Previously presented) The composition of claim 116, comprising building blocks coupled to the support through electrostatic interaction between a negatively charged group of the building block and a positively charged group of the support.

118. (Previously presented) The composition of claim 116, comprising building blocks coupled to the support through electrostatic interaction between a positively charged group of the building block and a negatively charged group of the support.

119. (Previously presented) The composition of claim 116, comprising building blocks coupled to the support through electrostatic interaction between protonated amine of the building block and carboxylate of the support.

120. (Previously presented) The composition of claim 116, comprising building blocks coupled to the support through electrostatic interaction between carboxylate of the building block and protonated amine of the support.

121. (Previously presented) The composition of claim 116, wherein coupling comprises interaction between hydrogen bond donor of the building block and a hydrogen bond acceptor of the support.

122. (Previously presented) The composition of claim 116, wherein coupling comprises interaction between hydrogen bond acceptor of the building block and a hydrogen bond donor of the support.

123. (Previously presented) An artificial receptor, the artificial receptor comprising a plurality of building blocks coupled to a support;
the building blocks coupled to the support through covalent bond, electrostatic interaction, or mixture thereof.

124. (Previously presented) A heterogeneous building block array comprising:
a support; and
a plurality of spots on the support;
the spots comprising a plurality of building blocks; and
the building blocks being coupled to the support through covalent bond, electrostatic interaction, or mixture thereof.

125. (Previously presented) A composition comprising:
a surface; and
a region on the surface comprising a plurality of building blocks;
the building blocks being coupled to the support through covalent bond, electrostatic interaction, or mixture thereof.

126. (Previously presented) An artificial receptor, the artificial receptor comprising a plurality of building blocks coupled to a support;
each building block independently comprising negative charge, positive charge, hydrogen bond donor, hydrogen bond acceptor, hydrophobic moiety, or a combination thereof.

127. (Previously presented) A heterogeneous building block array comprising:
a support; and
a plurality of spots on the support;
the spots comprising a plurality of building blocks;
the building blocks being coupled to the support;
each building block independently comprising negative charge, positive charge,
hydrogen bond donor, hydrogen bond acceptor, hydrophobic moiety, or a combination
thereof.

128. (Previously presented) A composition comprising:
a surface; and
a region on the surface comprising a plurality of building blocks;
the building blocks being coupled to the support;
each building block independently comprising negative charge, positive charge,
hydrogen bond donor, hydrogen bond acceptor, hydrophobic moiety, or a combination
thereof.

129. (Previously presented) A composition of matter comprising a plurality of
building blocks; the building blocks having the formula:
linker-framework-(first recognition element)(second recognition element);
the building blocks being configured to be coupled to a support through covalent
bond, electrostatic interaction, or mixture thereof.

130. (Previously presented) A composition of matter comprising a plurality of
building blocks; the building blocks having the formula:
linker-framework-(first recognition element)(second recognition element);
each building block independently comprising negative charge, positive charge, hydrogen
bond donor, hydrogen bond acceptor, hydrophobic moiety, or a combination thereof.

131. (New) The method of claim 78, wherein:
a third spot comprises a third combination of building blocks;

a fourth spot comprises a fourth combination of building blocks;
wherein the series continues through an nth spot comprising an nth combination of building blocks and n is less than 1.66 million.

132. (New) The method of claim 131, wherein n is less than or equal to 816, 2300, 3,060, 3,240, 12,650, 14,950, 85,320, 88,560, 100,000, 1.66 million, or 1,633,740.

133. (New) The method of claim 78, further comprising:
mixing 2, 3, 4, 5, or 6 different building blocks;
wherein applying comprises applying the mixture of building blocks to the solid support in at least one of the spots.

134. (New) The method of claim 78, wherein applying comprises applying individual activated building blocks to the support in at least one of the spots.

135. (New) The method of claim 78, further comprising:
providing a set of building block;
selecting from the set of building blocks 2, 3, 4, 5, or 6 different building blocks;
wherein applying comprises applying the selected building blocks to the support in at least one of the spots.

136. (New) The method of claim 78, wherein the building blocks coupled to the support are in proximity to one another.

137. (New) The method of claim 78, further comprising:
providing a support comprising a functionalized lawn;
wherein coupling comprises coupling the different building blocks to the lawn in spots.

138. (New) The method of claim 78, wherein the building blocks independently have the formula:

linker-framework-(first recognition element)

|
(second recognition element).

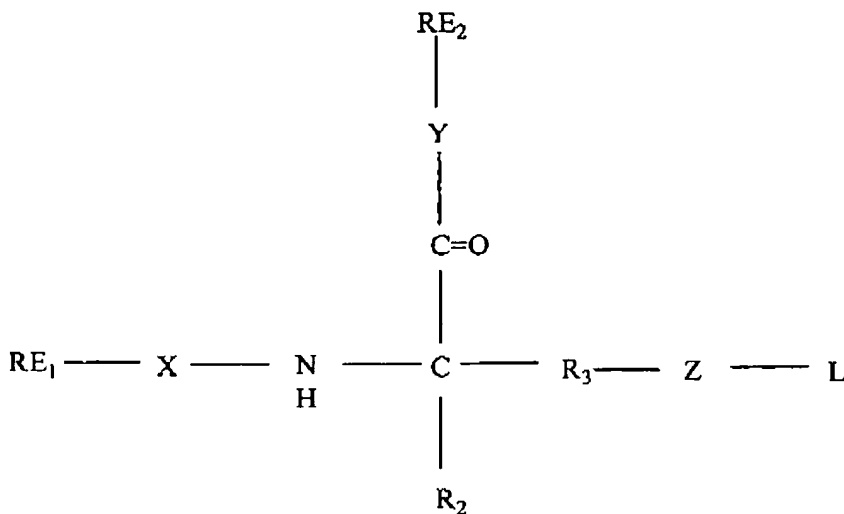
139. (New) The method of claim 138, wherein the framework is of the formula of an amino acid.

140. (New) The method of claim 139, wherein the amino acid is serine, threonine or tyrosine.

141. (New) The method of claim 140, wherein the amino acid is tyrosine.

142. (New) The method of claim 138, wherein the linker is of the formula $(CH_2)_nC(O)-$, with $n=1-16$.

143. (New) The method of claim 78, wherein the building blocks independently are of the formula:



in which:

X is absent or C=O;

Y is absent, NH, or O; Z is O;

R₂ is H or CH₃;

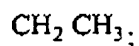
R₃ is CH₂ or CH₂-phenyl;

RE₁ is B1, B2, B3, B4, B5, B6, B7, B8, B9, A1, A2, A3, A4, A5, A6, A7, A8, or A9;

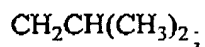
RE₂ is A1, A2, A3, A4, A5, A6, A7, A8, A9, B1, B2, B3, B4, B5, B6, B7, B8, or B9;

L is (CH₂)_nCOOH, with n=1-16;

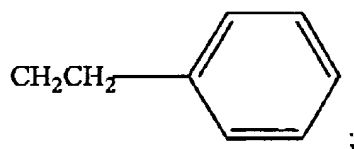
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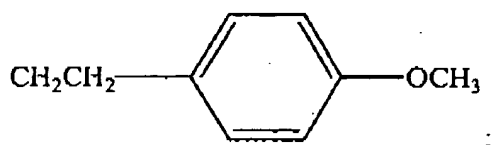
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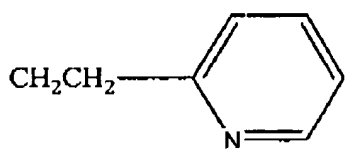
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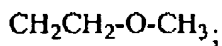
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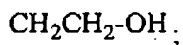
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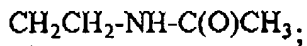
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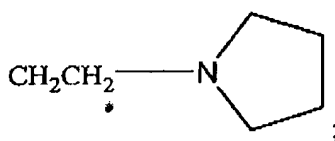
A7 is



A8 is



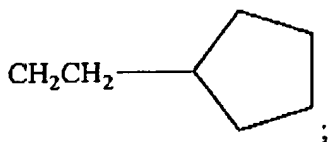
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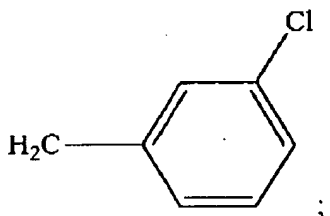
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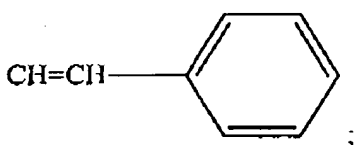
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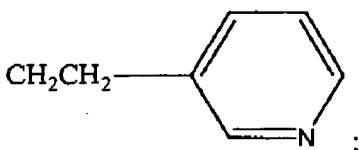
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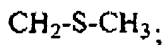
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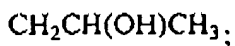
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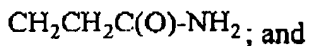
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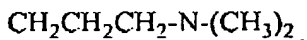
B7 is



B8 is



B9 is



144. (New) The method of claim 78, wherein applying comprises piezoelectric spotting, pin spotting, or electromagnetic spotting.

145. (New) The method of claim 78, wherein the solid support comprises a glass plate or microscope slide.

146. (New) The method of claim 78, wherein each spot comprises 3, 4, or 5 different building blocks.